

WHAT IS CLAIMED IS:

- 1 1. An assisted pole tip arrangement, comprising:
2 a pole tip; and
3 a magnetic bias field source disposed proximate to the pole tip for providing a
4 magnetic bias field for enhancing magnetization switching of the pole tip.
- 1 2. The assisted pole tip arrangement of claim 1 wherein the pole tip
2 comprises a longitudinal axis, the magnetic bias field being oriented substantially
3 transverse to the longitudinal axis of the pole tip.
- 1 3. The assisted pole tip arrangement of claim 1 wherein the magnetic bias
2 field source is an external magnet.
- 1 4. The assisted pole tip arrangement of claim 1 wherein the magnetic bias
2 field source is a magnet provided in-situ proximate the pole tip.
- 1 5. The assisted pole tip arrangement of claim 1 wherein the magnetic bias
2 field source comprises a current path in-situ proximate to the pole tip, the current path
3 being coupled to a write coil for using a write current to provide the magnetic bias field.
- 1 6. The assisted pole tip arrangement of claim 5 wherein the current path
2 comprises a single path proximate to the pole tip, the single path providing a parallel path
3 for write current to flow.

1 7. The assisted pole tip arrangement of claim 5 wherein the current path
2 comprises a first leg and a second leg, the first leg extending across the pole and the
3 second leg arranged proximate to the pole tip.

1 8. The assisted pole tip arrangement of claim 5 wherein the first and second
2 leg are disposed between the write coil and a negative pole of the write coil.

1 9. The assisted pole tip arrangement of claim 1 wherein the magnetic bias
2 field is transverse to an easy axis of magnetization for the pole tip.

1 10. The assisted pole tip arrangement of claim 1 wherein the magnetic bias
2 field decreases an effective anisotropy-field opposing a driving-field and increases initial
3 torque that the driving field has on the magnetization.

1 11. The assisted pole tip arrangement of claim 1 further comprising a lead
2 coupled to the magnetic bias field source, the lead being formed with a thickness greater
3 than a thickness of the magnetic bias field source to lower overall resistance.

1 12. The assisted pole tip arrangement of claim 1 wherein the magnetic bias
2 field is generated by bias-current flowing perpendicularly to an air bearing surface
3 through the magnetic bias source.

1 13. A magnetic head, comprising:
2 a first pole and a second pole, the first and second pole being separated to form a
3 write gap at a pole tip;
4 a coil disposed between the first and second poles for producing at the write gap
5 magnetic fields used to record data; and
6 a magnetic bias field source disposed proximate to the pole tip for providing a
7 magnetic bias field for enhancing magnetization switching of the pole tip.

1 14. The magnetic head of claim 13 wherein the pole tip comprises a
2 longitudinal axis, the magnetic bias field being oriented substantially transverse to the
3 longitudinal axis of the pole tip.

1 15. The magnetic head of claim 13 wherein the magnetic bias field source is
2 an external magnet.

1 16. The magnetic head of claim 13 wherein the magnetic bias field source is a
2 magnet provided in-situ proximate the pole tip.

1 17. The magnetic head of claim 13 wherein the magnetic bias field source
2 comprises a current path in-situ proximate to the pole tip, the current path being coupled
3 to a write coil for using a write current to provide the magnetic bias field.

1 18. The magnetic head of claim 17 wherein the current path comprises a
2 single path proximate to the pole tip, the single path providing a parallel path for write
3 current to flow.

1 19. The magnetic head of claim 17 wherein the current path comprises a first
2 leg and a second leg, the first leg extending across the pole and the second leg arranged
3 proximate to the pole tip.

1 20. The magnetic head of claim 17 wherein the first and second leg are
2 disposed between the write coil and a negative pole of the write coil.

1 21. The magnetic head of claim 13 wherein the magnetic bias field is
2 transverse to an easy axis of magnetization for the pole tip.

1 22. The magnetic head of claim 13 wherein the magnetic bias field decreases
2 an effective anisotropy-field opposing a driving-field and increases initial torque that the
3 driving field has on the magnetization.

1 23. The magnetic head of claim 13 further comprising a lead coupled to the
2 magnetic bias field source, the lead being formed with a thickness greater than a
3 thickness of the magnetic bias field source to lower overall resistance.

1 24. The magnetic head of claim 13 wherein the magnetic bias field is
2 generated by bias-current flowing through the magnetic bias source perpendicular to an
3 air bearing surface.

1 25. A magnetic data storage system, comprising:
2 at least one magnetic storage medium;
3 a magnetic head, for reading data from and writing data to the at least one
4 magnetic storage medium;
5 a media translator for moving the at least one magnetic storage medium relative to
6 the transducer; and
7 a signal processing system, coupled to the media translator and to the magnetic
8 head, for processing signals for the magnetic head and for controlling the media
9 translator;
10 wherein the magnetic head further comprises:
11 a first pole and a second pole, the first and second pole being separated to
12 form a write gap at a pole tip;
13 a coil disposed between the first and second poles for producing at the
14 write gap magnetic fields used to record data; and
15 a magnetic bias field source disposed proximate to the pole tip for providing a
16 magnetic bias field for enhancing magnetization switching of the pole tip.

1 26. The magnetic data storage system of claim 25 wherein the pole tip
2 comprises a longitudinal axis, the magnetic bias field being oriented substantially
3 transverse to the longitudinal axis of the pole tip.

1 27. The magnetic data storage system of claim 25 wherein the magnetic bias
2 field is transverse to an easy axis of magnetization for the pole tip.

1 28. The magnetic data storage system of claim 25 wherein the magnetic bias
2 field is generated by bias-current flowing perpendicularly to an air bearing surface
3 through the magnetic bias source.

1 29. An assisted pole tip arrangement, comprising:
2 means for providing magnetic fields for recording data on a magnetic recording
3 medium; and
4 means, operatively coupled to the means for providing magnetic field for
5 recording data on a magnetic recording medium, for providing a magnetic bias field for
6 enhancing magnetization switching of the means for providing magnetic fields for
7 recording data on a magnetic recording medium.

1 30. A magnetic head, comprising:
2 means for providing a path for magnetic fields used to record data on a magnetic
3 recording medium;
4 means, coupled to the means for providing a path, for producing the magnetic
5 fields used to record data; and
6 means, coupled to the means for providing a path, for providing a magnetic bias
7 field for enhancing magnetization switching of the means for providing a path for
8 magnetic fields.